AN EXAMINATION OF HOLLAND'S THEORY REGARDING AN AFRICAN-AMERICAN SAMPLE COMPARED WITH A WHITE SAMPLE

by

JOSEPH J. CAMP

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Abstract of a Dissertation Presented to the Graduate School
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by

Joseph J. Camp

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The purpose of this study was to investigate the Holland theory relative to its usefulness in measuring personal and environmental traits of African-Americans. The independent variable was race and the dependent variables included the Holland personality traits (i.e., R, I, A, S, E, and C). African-American and White engineering students were compared.

The investigation was conducted at four universities in the State of Florida. One hundred sixty subjects were included in the study. The sample was not randomized. Females were not included in the study.

Significant findings were produced. Whites had significantly higher Holland code scores in all catagories with the exception of the Artistic (A) code. Whites scored higher in the critical Realistic (R) and Investigative (I) areas but had lower correlations among the predominate codes (i.e., I-R-E) for certain engineering fields. African-American correlations were higher among the predominate scales, but their scores were lower.

Even though there were significant differences between the two groups, the Holland theory via the operationalized instrument, the Self-Directed Search (SDS), was effective in identifying engineering types among both groups at a significant level. It was concluded that Holland's theory, for this sample, was not biased and that cultural differences probably accounted for most of the observed differences.

CHAPTER I
INTRODUCTION

Theorists in the United States have studied career issues since the beginning of the nineteenth century (Parsons, 1909). Concerns about employee selection, stability, interest, job satisfaction, turnover, and so forth have been of great interest (Brown & Brooks, 1990).

Only recently (i.e., 1980s and 1990s) has serious attention been given to career theories as they apply to minority persons (Carter & Swanson, 1990; Fouad & Dancer, 1992; Hansen, 1987; Hansen & Fouad, 1984; Holland & Gottfredson, 1992; Schwartz, 1992; Swanson, 1992; Thomas, 1986; Ward, 1980; Yom, Doughtie, & Chang, 1975). Reports such as the Hudson Institute (1988) and the United States Department of Labor (1993) suggested that ethnic minority persons will account for a much larger share of entrants into the work force by the year 2000, whereas White's share of entrants into the labor force will go down by the year 2000. This, along with the criticisms (Cheatham, 1990; Smith, 1983) of career theory (e.g., that most of the theories have been developed using White male populations), suggests a need to examine the validity of career theories relative to ethnic minority populations. The African-American population was chosen for this study because this population constitutes the largest visible ethnic minority group in the United States. Additionally, this group was chosen because significant criticism of career theory is generated on their behalf. In this study, Holland's theory (1973, 1985b), one of the most known career theories, was examined. More specifically, the issue of bias (i.e., is the theory measuring the same things among African-Americans as it does among Whites) was explored.

This chapter consists of the following sections: (a) an overview of career theories, (b) an in-depth review of Holland's theory, (c) a statement of the problem being investigated, (d) a need for the study, (e) a purpose for the study, and (f) a rationale for the approach to the study. These sections are followed by the research questions, a definition of terms used in the study, and the chapter concludes with a summary.

Overview

Many individuals have contributed to the current knowledge base of career theory. According to Brown and Brooks (1990), some of the more prominent theories include Parson's (1909) trait-and-factor, Roe's (1956) needs, Holland's (1966) structural-interactive, Bordin's (1968) psychodynamic, and Super's (1969) developmental. Each theorist has developed a unique concept in the area of career theory.

Parsons (1909), the "Father of vocational counseling," was primarily responsible for the development of trait-and-factor career theory. Also known as the 'actuarial method,' it is the measurement of individual differences in human behavior or the concept of matching people to occupations. Crites (1981) indicated that 'trait' and 'factor' take into consideration certain indigenous characteristics of individuals (e.g., intelligence, aptitude, achievement, skills, interests, and personality). The main focus of counseling in trait-and-factor theory is diagnosis, use of testing, job information, and the application of the expert and student role. Most current career theories make use of some aspect of the trait-and-factor approach.

Roe's (1956) career theory is based on needs. It proposed that genetic inheritance, social position, developmental experiences, needs satisfaction, patterns of psychic energy, and the intensity of the needs and their satisfaction are the primary determinants of the level of motivation that achieves expression in accomplishment.

The main counseling thrust in Roe's (1956) work is an understanding of the individual's history. This understanding can provide insight into the person's needs structure. Once needs structure is clear, occupational information is then presented that will support the client's career development.

Holland (1985b) developed a career theory that is similar to the trait-and-factor theory. Holland's structural-interactive theory postulates that vocational interests are one aspect of personality. Thus, in describing one's career interest, one is also describing personality. According to Holland, personality traits can be realized through the examination of academic interests, avocations, recreational preferences, and vocations. Holland's theory is described as structural-interactive because it links personality to jobs.

Holland (1973, 1985b) contended that individuals can be categorized into six trait types (i.e., Realistic, Investigative, Artistic, Social, Enterprising, and Conventional), each of which correlates to one of six identical environments. The environments are determined by the characteristics of the individuals who occupy them.

The counseling component of Holland's (1973, 1985b) work consists of matching persons' types with appropriate environments (i.e., congruence concept). It is assumed that congruence occurs when trait type matches environmental type. Thus, it is believed that there is a direct and positive correlation between employment success and congruence.

Bordin (1968) has been a leading theorist in support of the psychodynamic model of career theory. Crites (1981) believed that developers of this theoretical model, like the Freudian-based psychodynamic theory of individual behavior, have been able to borrow ideas successfully from other theories (e.g., trait-and-factor) and create a separate and different career theory.

Crites (1981) explained that the psychodynamic model of career theory is based on development and needs. Supporters of the psychodynamic model maintain that a person should be directed toward occupations which are gratifying and help reduce anxiety. Consequently, diagnosis and testing are widely utilized in the psychodynamic model.

Bordin (1968) specified three phases in the counseling component of the psychodynamic model. The first phase involves exploration and contract setting, wherein the counselor reviews the person's history. In the second phase the person has the option to engage in extensive personality analysis. The third phase is called "working for change" and involves the use of instruments, interviews, and occupational information to assist the person in successful career planning.

Super (1969), according to Crites (1981), was a primary spokesperson for the developmental theory of careers. This theory utilizes the concepts of time and change as factors which affect a person's career behavior. Change, according to Crites (1981), may be vocational, social, or personal.

In the developmental theory, the counselor assesses the career development process and the career stage of the person. Career counseling will begin once the career stage has been determined. It proceeds from degree of readiness, to decision making and then to reality testing. Instruments such as the Career Maturity Inventory (Crites, 1978a) are used in the assessment of the stage of career development (Crites, 1981).

Theoretical Framework

Holland's structural-interactive theory is widely used and highly operationalizable as evidenced by instruments based in whole or in part on the theory [e.g., Hansen & Campbell, 1985, Strong Interest Inventory (SII); Holland, 1985a, Self-Directed Search (SDS); Holland, 1970, Vocational Preference Inventory (VPI)].

Holland (1973, 1985b) explained that most theories of vocational development have two problems: they are either too broad or too specific. As an example, Holland believed that developmental theory (Super, 1969) is overly broad in scope and, therefore, of negligible value. Other theories like Roe's needs theory and Bordin's psychodynamic theory are considered to be too specific and, therefore, are also of negligible value, according to Holland.

Holland (1973, 1985b) sought a more comprehensive and usable theory that would stimulate research. Weinrach (1980) stated that Holland was influenced in the development of the structural-interactive theory through experiences as a military induction interviewer from 1942 to 1946; a counselor at Western Reserve University from 1950 to 1953; and a staff counselor at the Maryland, Veterans Administration Hospital from 1953 to 1956. Holland believed that a person could be categorized by certain identifiable traits, resulting in a classification system which could make career selection more effective.

Holland (1973) proposed four assumptions regarding the theory:

1. "In our culture, most persons can be categorized as one of six types: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional" (p. 2). Some combination of the first three letters of each category, (i.e., R, I, A, S, E, and C) are used by Holland to represent the types and environments included in the theory.

2. "There are six kinds of environments: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional" (p. 3). Environments reflect the personality of the dominant types.

3. "People search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles" (p. 4).

4. "A person's behavior is determined by an interaction between his personality and the characteristics of his environment" (p. 4).

To be able to identify the person's type and the environment's type allows one to assess the degree of fit between the person and the environment.

Holland (1985b) described the six environments that he proposed:

1. "The Realistic environment is characterized by the dominance of environmental demands and opportunities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines, and animals, and by a population dominated by realistic types" (p. 36). Occupational examples may include machine operator, truck driver, laborer, carpenter, and so forth.

2. "The Investigative environment is characterized by the dominance of environmental demands and opportunities that entail the observation and symbolic, systematic, creative investigation of physical, biological or cultural phenomena, and by a population dominated by Investigative types" (p. 37). Illustrative occupations are physicists, anthropologists, chemists, mathematicians, biologists, and so forth.

3. "The Social environment is characterized by the dominance of environmental demands and opportunities that entail the manipulation of others to inform, train, develop, cure, or enlighten, and by a population dominated by Social types" (p. 38). Illustrative occupations are social worker, teacher, interviewer, vocational counselor, and therapists.

4. "The Conventional environment is characterized by the dominance of environmental demands and opportunities that entail the explicit, ordered, systematic manipulation of

data, such as keeping records, . . . organizing written and numerical data according to a prescribed plan, . . . and by a population dominated by Conventional types" (p. 40). Illustrative occupations are bank tellers, secretaries, bookkeepers, and file clerks.

5. "The Enterprising environment is characterized by the dominance of environmental demands and opportunities that entail the manipulation of others to attain organizational or self-interest goals, and by dominance of the Enterprising types" (p. 39). Illustrative occupations are salesmen, politicians, managers, promoters, and business executives.

6. "The Artistic environment is characterized by the dominance of environmental demands and opportunities that entail ambiguous, free, unsystematized activities and competencies to create art forms or products, and by the dominance of Artistic types in the environment" (p. 38). Illustrative occupations are musicians, artists, poets, sculptors, and writers.

Holland (1985b) described the six types as they refer to personality:

1. "The special heredity and experiences of the Realistic person lead to a preference for activities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines, and animals and to an aversion to educational or therapeutic activities" (p. 19).

2. "The special heredity . . . of the Investigative person leads to a preference for activities that entail the observational, symbolic, systematic, and creative investigation of physical, biological, and cultural phenomena . . . and to an aversion to persuasive, social, and repetitive activities" (p. 19).

3. "The special heredity and experiences of the Artistic person lead to a preference for ambiguous, free, unsystematized activities that entail the manipulation of physical, verbal, or human materials to create art forms or products, and to an aversion to explicit, systematic . . . activities" (p. 20).

4. "The special heredity and experiences of the Social person lead to a preference for activities that entail the manipulation of others to inform, train, develop, cure, or enlighten; and an aversion to explicit . . . activities involving materials, tools, or machines" (p. 21).

5. "The special heredity and experiences of the Enterprising person lead to a preference for activities that entail the manipulation of others to attain organizational goals or economic gain; and an aversion to observational, symbolic, and systematic activities" (p. 21).

6. "The special heredity and experiences of the Conventional person lead to a preference for activities that entail the explicit, ordered, systematic manipulation of data, such as keeping records, . . . and to an aversion to

ambiguous, free, exploratory, or unsystematized activities" (p. 22).

Holland (1973, 1985b) used a hexagon (i.e., six-pointed figure) to represent the components of the theory. Each of the six points of the hexagon represents a different personal and environmental type. When represented by the hexagon, each type (i.e., R, I, A, S, E, and C) has its letter on one of the six points of the hexagon. This layout shows the relationships among the six types. For example, the Artistic type is adjacent to the Social because of their close relationship; however, the Artistic type is located across from the Conventional type because of their dissimilarity.

Holland (1985b) outlined five key concepts to his theory:

> 1. Consistency. Within a person or environment some pairs of types are more closely related than others. For example, Realistic and Investigative types have more in common than Conventional and Artistic types. Consistency is the degree of relatedness between personality types or between environmental models. Degree of consistency or relatedness are assumed to affect vocational preference. (p. 4)
>
> 2. Differentiation. Some persons or environments are more clearly defined than others. For instance, a person may closely resemble a single type and show little resemblance to other types, or an environment may be dominated largely by a single type. In contrast, a person who resembles many types or an environment that is characterized by about equal numbers of the six types is undifferentiated or poorly defined. The degree to which a person or environment is well defined is its degree of differentiation. (p. 5)
>
> 3. Congruence. Different types require different environments. For instance, Realistic

> types flourish in Realistic environments because such an environment provides the opportunity and rewards a Realistic type needs. Incongruence occurs when a type works in an environment that provides opportunities and rewards foreign to the person's preferences and abilities for instance, a Realistic type in a Social environment. (p. 5)
>
> 4. Calculus. The relationships within and between types or environments can be ordered according to a hexagonal model in which the distances between the types or environments are inversely proportional to the theoretical relationship between them. (p. 5)
>
> 5. Identity. This concept provides an estimate of the clarity and stability of a person's identity or the identity of an environment. Personal identity is defined as the possession of a clear and stable picture of one's goals, interests, and talents. Environmental identity is present when an environment or organization has clear, integrated goals, tasks, and rewards that are stable over long time intervals. (p. 5)

Holland's (1985b) instrument, the Self-Directed Search (SDS), separates the six types into three high point codes which describe the subjects type (e.g., I, R, and E). In this example the "I" would be considered the highest point in the code structure followed by the "R" which represents the second high point code, and finally followed by the "E" which represents the third high point code. This set of "predominant" codes relates to a work environment (e.g., the IRE code relates to certain types of engineering positions). Therefore, if the subject has this configuration of codes (i.e., I, R, and E) based on test results, some types of engineering may be suitable fields, notwithstanding academic ability and other factors (e.g., money, motivation, location of training, grades, etc.). Holland (1985b) supplied a "job finder" with each test instrument that outlines many of the positions corresponding to the three high point codes.

Brown and Brooks (1990) emphasized that published journal articles, instrumentation based on the concept, conventions devoted to the concept, and doctoral dissertations completed on the concept attest to the popularity of a theory. Given these criteria, Holland's (1973) theory generated considerable interest. There are over 250 references listed in the Self-Directed Search Manual (Holland, 1985a).

With most famous theories there will also be criticism. Holland's (1973, 1985b) theory is no exception. Holland (1985b) noted various areas which require further research:

1. Validity studies among high school, college, and business populations.

2. Person-environment interaction research in relation to job satisfaction, stability and change, types, and career-coping issues.

3. Experimentation on the Self-Directed Search (i.e., one of Holland's test instruments).

4. More comprehensive analysis of environmental types.

Other researchers (Lamb & Prediger, 1979; Prediger, 1981; Prediger & Cole, 1975; Weinrach, 1980) have questioned certain aspects of Holland's (1973) theory. One concern is that the theory may be biased relative to gender. Females appear to score consistently higher on the conventional scale of the Self-Directed Search (SDS) than do males. Opponents of the theory point out that this gender difference may tend to discourage females from entering skilled trades and may also discourage males from entering office occupations. Holland (1982) replied to this criticism by indicating that valid and reliable interest instruments correctly indicate the interests of people at the time the inventory is administered. The fact that men and women answer in traditional ways is not a good indictment of the instruments but rather a reflection of the cultural pressures on their development.

Prediger (1981) asserted that the SDS should be norm-referenced (i.e., comparing the test-taker to a group) rather than using raw scores. Thus, more occupations for women and minority persons would present themselves as options.

In rebuttal, Holland (1982) maintained that it is unethical to compromise the predictive validity of an instrument, even to accomplish a laudable social objective. Holland believed that when one promotes nontraditional careers, one also denigrates traditional careers, and this strategy may not be sanctioned by everyone. Holland stated that there is no easy way out of this dilemma.

Cheatham (1990), in an exposition, strongly rejected the idea that Holland's theory is accurate when applied to an African-American population. Cheatham explained that evidence shows that Whites differ from African-Americans in regards to career development and interests (Gibbs, 1986; Lee, 1985; Smith, 1983). Smith (1983) saw a need for more research with career development and African-American groups. Smith explained that two positions appear in the career literature regarding African-American groups. One position suggests that all career theories are of little or no value to African-Americans. A second position suggests that there are deficiencies but that the theories could be valuable in understanding the career development of African-Americans. Smith noted that criticism of career theories focused on the fact that they traditionally were developed based on majority (i.e., White), not minority (e.g., African-American) populations. It is further suggested that career theories may be based on faulty assumptions with regard to African-Americans and may actually ignore the realities (e.g., social, cultural, and economic) that shape the lives of some minority persons.

Statement of the Problem

The problem investigated in this research study concerns the validity of the Holland theory when used with African-Americans. This study was undertaken because some researchers (Cheatham, 1990; Prediger, 1981; Smith, 1983) indicated that the Holland model may not accurately reflect the interests or career aspirations of African-Americans. Hansen (1992) outlined two primary problems with research in this area. The first problem is considerable difficulty in obtaining adequate sample sizes because of the small population size, and the second problem is that potential subjects are often suspicious of researchers and the intent of the research.

Need for the Study

Questions remain unanswered. Is the Holland theory useful regarding placement, career selection, and job fit with an African-American population? Is there a difference between African-Americans and Whites regarding the Holland theory? If the relationship between White traits and African-American traits is more clearly understood, implications may exist for personnel administrators, college counselors, industrial counselors, and psychologists. Results of this study provide data for further research into the Holland theory. Perhaps Swanson (1992) stated the need for this study best:

> Despite the enormous amount of research generated by Holland's model, the adequacy of the model for cross-ethnic samples, particularly African-Americans, has not received much attention. Given the increasing diversity of students enrolling in college and workers entering the labor market, we simply do not know enough about whether constructs of career behavior developed in Caucasian samples generalize to non-Caucasian people. (p. 155)

Purpose of the Study

The purpose of this study was to investigate the Holland (1973, 1985b) theory relative to its usefulness in measuring personal traits of African-Americans. Variables investigated included the Holland personality traits (i.e., R, I, A, S, E, and C). African-American scores on these scales were compared to those of Whites.

Rationale for the Approach to the Study

While a large amount of research is accumulating concerning the Holland theory, researchers continue to call for current samples rather than old institutional data sets (Swanson, 1992). Many of the current studies have used data that was obtained for other purposes (e.g., historical normative data) and was employed to make observations about African-Americans. Another criticism is that sample size on most current studies is usually small (e.g., n=20). This study investigated a new larger sample of students self-selected into specialized educational programs (i.e., specific engineering students) and examined comparisons between African-Americans and Whites. Another difference in this study is that it utilized an assumption that people who have worked harder or longer to achieve something or have acquired some very special skill will reflect some appropriate set of Holland's codes (i.e., R, I, A, S, E, and C) more clearly than subjects chosen from lower level educational or occupational areas that do not require special training or a higher level of self-selection (i.e., commitment) into some area. Examining highly self-selected characteristics makes sense, and Campbell (1977) used the concept in the development of the Strong-Campbell Interest Inventory. Campbell observed characteristics of people who, for example, had longer tenure and more difficulty in attaining their roles. Campbell surmised that the characteristics of people who had achieved certain difficult criteria would be better descriptors of the position (i.e., job) than characteristics of people adrift in educational or occupational areas that are available to anyone who applies for them or needs a degree or money.

Research Questions

1. Do African-American and White students who have selected the same educational program (i.e., specific engineering) differ across the six scales (i.e., R, I, A, S, E, and C) of Holland's SDS instrument?

2. If any differences exist between these African-American and White students, are they restricted to the "subordinate" scales of the SDS, that is, the three scales not included in Holland's three-character code for the educational program or occupational group (e.g., engineers) in question? For example, certain engineering specialties (e.g., electrical) are classified by Holland as "IRE." If Holland's theory is not biased, we would expect these African-American and White students to score similarly on the "predominant" I, R, and E scales. However, African-Americans and Whites may differ on the "subordinate" scales A, S, and C, as these scales may measure other incidental differences between races that are not related to these subjects' common occupational preferences.

3. Are the correlations among the three "predominant" scales comprising Holland's three-character code for the educational program in question higher than the correlations among the three "subordinate" scales? If so, does this pattern of correlations hold equally true for African-American and White students who have chosen the same advanced educational program? For example, for certain engineering fields, we might expect the correlations among the I, R, and E scales to be significant and positive. On the other hand, correlations among the "subordinate" scales A, S, and C should be lower, as the latter scales measure individual differences that are not related to the subjects' common occupational preferences. If Holland's theory is not biased, this pattern of correlations should be equally applicable to African-Americans and Whites in the same educational program.

4. Do African-American and White students who have selected the same advanced educational program differ in distribution of their three-character Holland codes (i.e., as determined by the three high point codes on the six Holland scales)? Electrical engineers, for example, should ideally be classified as "IRE"; any exceptions to this classification should at least be some combination of I, R, and E. If Holland's theory is not biased, the pattern of three-character Holland codes should be similar for African-Americans and Whites in the same educational program.

Definition of Terms

The following terms are used in this study:

Actuarial Method refers to statistical calculation (Crites, 1981).

Career Maturity Inventory is an instrument designed to measure career choice process as opposed to career choice content (Crites, 1978a).

Congruence is the degree of fit between a personality type and an environment (Holland, 1985b).

Norm-Referenced refers to a test designed to measure a subject's status in relation to the performance of a group of other subjects who have completed that test (Popham, 1981).

Nontraditional Career is a career area not historically populated by a particular race, creed, culture, physical challenge, or sex.

Self-Directed Search is an interest instrument operationalized using the Holland (1985a) theory.

Strong Interest Inventory is an interest instrument utilizing the Holland theory (1973, 1985b) in the General Occupational themes section.

Vocational Preference Inventory is an interest instrument utilizing the Holland theory and other measures of personality (Holland, 1970).

Overview of the Remainder of the Study

The remainder of the research is sectioned into four chapters. Chapter II is a review of the literature regarding the Holland theory and African-American populations and related issues. Chapter III is a review of the methodology, including procedures and descriptions. Chapter IV is a presentation of the results of the study. Chapter V is a discussion of the results of the study.

CHAPTER II
REVIEW OF THE RELATED LITERATURE

While analyzing career theories it becomes apparent that most have been validated using data obtained from special populations. For example, Roe's (1956) need theory was based on research conducted on scientists. Early developmental theory (Ginzburg, Ginzburg, Axlerod, & Herma, 1951) was based on data gathered from highly talented adolescents. The subject of this study, Holland's theory (1985b), is no exception. Holland studied National Merit Scholars and college freshmen. Theories, validated on highly unique and mostly White populations, have set in motion complaints (Cheatham, 1990) regarding the validity of the Holland theory as it is applied to an African-American population.

Cheatham (1990) expressed concerns about inappropriate norms. Cheatham's criticisms have been supported by other researchers (Carter & Swanson, 1990; Guthrie, 1976; Merton, 1957; Nobles, 1976; Swanson, 1992; Warwick, 1980). Cheatham (1990) contended that it may not be appropriate to use one's own cultural or ethnic group to explain the behaviors of another group and points to the concepts of 'Eurocentrism' and 'Africentrism.' According to Cheatham (1990), Eurocentrism is a belief that Anglo-American culture and especially Euro-American culture is superior to other cultures. The Eurocentric concept espouses western values such as competition, individuation, mastery over nature, and rigid time concepts. The Eurocentric concept, according to Cheatham, assumes that all cultures adhere to western values. Conversely, Africentrism deemphasizes the individual person. He or she exists only as a reflection of the overall group. According to Cheatham, values of Africentrism include a rhythmic music involvement, an emphasis on affect, communalism, expressive individualism, a social time perspective, orality, and a person-to-person orientation.

Cheatham (1990) stated,

> Americans of African descent share a sociocultural history and experience based upon negative attributions to race and color. Beyond that legacy, in response to slavery's enforced isolation and disenfranchisement, the forbearers of African-Americans evolved systems and relations specific to their needs. (p. 337)

Cheatham (1990) further stated, "Furthermore, it is concluded that these evolved forms undeniably had their genesis in African form and tradition" (p. 337). Cheatham (1990) concluded that theories and operationalized instruments, derived from persons who adhere to Eurocentric concepts (e.g. Holland) may not be appropriate when used with persons of African-American heritage.

Nobles (1991) contended that a "Black Psychology" must emerge because African-Americans differ from Whites in many ways. Nobles explained the differences by examining certain

African philosophies. Nobles also suggested how the original culture was maintained. There are no sacred scriptures or texts. Concepts and philosophies of religion in the African culture are not written down but, instead, are passed on verbally from one generation to another as are most other customs and philosophies. One reason for this strong tradition, according to Nobles, is the African belief that the spirit never dies but lives on after death in one of two possible time periods. During the Sasa period (living dead), memory of the deceased is carried on through the discussion of his or her ancestors and friends. Once all of these ancestors and friends themselves have passed on, and memory is lost, the deceased enters the Zamani period (spirit). He or she enters the spirit world at this time. Procreation has always been a way to ensure lasting memory and, therefore, a longer stay in the Sasa period. Because of their belief in the Sasa and Zamani periods, much emphasis has been placed on the communication of the memories of the deceased to others. In the United States, the institution of slavery unknowingly contributed to the continuation of the oral tradition of African-Americans. Slaves were not permitted to read, write, or codify their heritage. As a result, they passed on their heritage through speech.

Nobles (1991) indicated that time is another cultural issue for African-Americans. Africans, generally, give little concern to time. Time is to be experienced before it is understood. This attitude, in which time is viewed as "phenomenal" rather than "mathematical," remains a part of African-American culture to this day.

Discussing other traditions of African-Americans, Nobles (1991) explained an interesting routine of the Avogan and the Lobi people of Africa. These peoples have evolved a custom which is common to many African groups where ritualized orations provide an offended person the chance to ridicule and insult the offender. Obscene gestures and language are allowed. The purpose of this ritual is to make the offended person feel better and retain more control and perhaps stop what could, under other circumstances, become socially unacceptable behavior. Nobles sees a current day equivalent to this ceremony in a game called "Playing the Dozens" and in a musical form called "Rapping" which is practiced by many African-American youth.

Nobles believes that these, and other, orally communicated customs make the African-Americans different from the Whites, and, therefore, African-Americans require a different psychology to be understood. Nobles believes that using psychological concepts based on the majority culture (i.e., White) will not allow an adequate understanding of African-Americans.

The United States Department of Labor (1993), Occupational Outlook Handbook (O.O.H.), makes commentary on future labor force trends. The researchers of the O.O.H.

have suggested that minorities, including African-Americans, will constitute a much larger share of the work force in the future. White non-Hispanics now comprise the largest group in the labor force, though their numbers have been steadily declining. In 1990, White non-Hispanics accounted for 79% of the labor force. By the year 2005 it is projected that this group will account for 73% of the labor force. Projected change is primarily attributed to a lower birth rate for this group. Conversely, African-Americans will account for approximately 12% of the labor force by the year 2005, while Hispanics and Asians will account for about 15%. Subsequently, it will become increasingly important to know how effective career theories are at predicting career satisfaction with African-Americans and other minority groups.

This chapter includes the following sections: (a) an introduction to the Holland theory, (b) an examination of congruence studies conducted with African-American samples, (c) a review of African-American and White congruence studies and a congruence study on a nonwestern population, (d) support for the approach to the study, and (e) support for the measurement technique. The chapter ends with a summary.

Introduction to the Holland Theory Review

Given the enormous amount of research generated by the Holland theory, (i.e., over 1,000 studies), it would be a huge and unnecessary task to review it all. This review focuses on congruence (i.e., the similarity between a personality type and an environmental type) studies of African-American populations and African-American versus White populations. Additionally, a nonwestern population congruence study is reviewed.

Congruence Studies with African-American Samples

O'Brien and Walsh (1976) conducted a study of non-college-degreed African-American working men. The study was designed as an investigation of two areas: (a) the concurrent validity of Holland's theory and (b) the relationship among same-name scales of the Vocational Preference Inventory (VPI) (Holland, 1970) and the Self-Directed Search (SDS) (Holland, 1985a). The SDS assesses the six personality types as defined by Holland. It is considered an extension of the VPI and shows evidence of reliability and validity (Holland, 1970). The sample consisted of 121 African-American non-college-degreed working males. Volunteer subjects were chosen from Holland's six occupational types (i.e., R, I, A, S, E, and C) corresponding to Holland's six identical occupational environments. Realistic types were chosen from a sample of maintenance persons (_n_=20). Investigative types were selected from x-ray and lab technicians (_n_=16). Artistic types were selected from musicians and entertainers (_n_=16). Social types were selected from youth leaders (_n_=21). Enterprising types were selected from salespersons (_n_=18). Conventional types were selected from inventory clerks (n=30). The mean length of employment for the sample ranged from 2.5 years to 17.9 years. Subjects ranged in age from 17 to 68, and none had completed more that two years of college. Multivariate analysis of variance (MANOVA) across the 12 scales of the of the two inventories indicated the groups differed significantly. Univariate analysis of variance (ANOVA) of each scale revealed that four scales of the VPI (i.e., Realistic, Artistic, Enterprising, and Conventional) and four scales of the SDS (i.e., Realistic, Investigative, Artistic, and Conventional) differentiated the groups as suggested by the Holland theory. Regarding the comparison of the same-name scales of the VPI and the SDS, all correlation coefficients of the same-name scales were found to be significant. The researchers concluded that Holland's theory may be meaningful for employed non-college-degreed African-American males.

Bingham and Walsh (1978) studied the concurrent validity of Holland's theory for college-degreed African-American women. This study was designed to (a) assess the concurrent validity of the Holland theory for college-degreed employed African-American women and (b) study the relationship between same-name scales of the VPI and the SDS. The sample of volunteer subjects was composed of 93 African-American women with college degrees from six occupational areas corresponding to Holland's environmental classifications. Realistic types were selected from engineers (n=11).

Investigative types were selected from physicians (_n_=15). Enterprising types were selected from lawyers (_n_=18). Social types were selected from social workers (_n_=18). Artistic types were selected from English teachers. Conventional types were selected from business teachers (_n_=16). All of the subjects had at least one year of experience in their respective fields. They ranged in age from 23 to 61 years of age, and each had at least a Bachelor of Arts (BA) degree. The one exception was an engineer who had three years of college. Results of a MANOVA indicated that the groups differed significantly across the 12 scales of both instruments. Univariate ANOVAs on each individual scale indicated that there were significant differences on four VPI scales (i.e., Investigative, Artistic, Social, and Conventional) consistent with Holland's theory. On the SDS, five scales (i.e., Realistic, Investigative, Social, Enterprising, and Conventional) identified occupational groups according to Holland's theory. The researchers concluded that the findings lend some support to the concurrent validity of Holland's theory for employed college-degreed African-American females. The researchers suggested caution due to low correlations and absence of other predicted results. Sample size was also small in most instances. Results of the comparison of same-name scales between the VPI and SDS indicated significance in each case.

Ward and Walsh (1981) conducted a study of the concurrent validity of the Holland theory for non-college-degreed African-American women. This study examined (a) the validity of the Holland theory for the six occupational groups as predicted by Holland and (b) a comparison of the same-name scales of the VPI and the SDS.

The sample consisted of 102 volunteer non-college-degreed African-American women from seven occupations corresponding to Holland's environmental types. Realistic types were selected from maids (n=17). Investigative types were selected from x-ray technicians (n=16). Artistic types were selected from florists and dancers (n=12). Social types were selected from teachers aids (n=18). Enterprising types were selected from sales clerks (n=16). Conventional types were selected from clerk typists (n=23). Subjects had at least one year of work experience and less than two years of college. They ranged in age from 19 to 77 with a mean age of 32.8 years.

The first hypothesis was tested using MANOVA. The groups differed significantly across 12 scales. Univariate ANOVAs on each of the scales revealed significant differences on four of the VPI scales (i.e., Realistic, Investigative, Artistic, and Enterprising). These four scales identified occupational groups according to Holland's theory. Four of the SDS scales (i.e., Investigative, Artistic, Enterprising, and Conventional) identified occupational groups according to

Holland's theory. Mean scores for the various groups on the Social and Conventional scales of the VPI were not found to be significantly different (p>05). The mean scores for the various groups on the Realistic and Social scales of the SDS were not found to be significantly different (p>05).

The same-name scales of the VPI and SDS were tested using the Pearson Product-Moment Correlation Coefficient. Findings from this statistical test suggest that all correlations for same-name scales between the VPI and SDS were found to be significant (p>.01) and ranged from .61 on the Realistic scale to .80 on the Enterprising scale. The researchers concluded that the findings lend some support to the concurrent validity of Holland's theory for employed non-college-degreed African-American women.

African-American and White Comparison Studies

Kimball, Sedlacek, and Brooks (1973) conducted a study comparing the results of African-American and White students who had taken the Self-Directed Search at a major northern university. The researchers were concerned that African-American students may be getting more primary (i.e., high point personality code) or first choice codes of Realistic on the SDS when compared to White students. The subjects were a random sample of 143 African-American students and 143 White students chosen from an incoming freshmen class of 4,631 students. Chi-square and t test analyses were conducted on testing outcomes. Results of the study suggested that

African-American students did not receive more Realistic codes than White students for the sample studied; White students actually received significantly more Realistic codes than African-American students. It did appear that African-Americans had more first choice Social codes on the SDS. Researchers contend that these findings are consistent with the results of earlier works by Hager and Elton (1971).

Yom, Doughtie, and Chang (1975) conducted a study of African-Americans and the Holland theory. This study investigated whether the variables measured by the VPI (Holland, 1970) were the same for a random sample of both African-American and White students. Scores were factor analyzed independently, and the scores for the African-American students (n=115) were rotated to match the scores for the White students. The White students were drawn from an earlier study (n not noted). Results of the comparison showed that there were similar structures between both groups. According to researchers, the only variable that was noticeably different was the loading for the African-American and White samples on the Artistic scale. Although statistically a reasonable fit, the Artistic scale had the weakest correspondence between the two populations. Researchers concluded that the VPI measures the same variables for both African-American and White Students.

Walsh, Hildebrand, Ward, and Matthews (1983) have studied the Holland theory in relation to non-college-degreed working African-American women and White women. The purpose of this investigation was to compare the differences between African-American and White American women working in traditional female occupations using the VPI and the SDS. The following hypotheses were investigated in this study:

1. There are no significant differences in mean raw scores between African-American and White American women.

2. There are significant differences in mean raw scores for the three occupational groups studied.

3. There are no differences in mean scores among African-American and White occupational groups.

The subjects were African-American (n=55) and White American (n=55) female non-college-degreed workers. The entire sample was subdivided into three groups according to Holland's (1973) vocational environments. Investigative types were selected from laboratory technicians (n=15 White and n=16 African-American). Enterprising types were selected from salespersons (n=20 White and n=16 African-American), and Conventional types were selected from clerk typists (n=21 White and n=23 African-American).

All subjects had at least one year of experience in their positions. The researchers noted that Realistic, Artistic, and Social scales could not be reported in this study because comparisons for African-American women and White women in the same occupation could not be made on these scales. The reason for this decision was that not enough subjects in those categories (i.e., R, A, and S) could be found.

Rao's Approximate F Test (Clyde, 1969) was used to test for multivariate differences and was found to be significant across the 12 scales. Univariate results suggest that the Enterprising and Conventional scales of the VPI and the Enterprising scale of the SDS successfully discriminated among the occupational groups. In addition, researchers concluded from the Investigative scale and the Conventional scale of the SDS that White women, when compared to African-American women in the same occupations, tend to report similar raw scores. The mean raw score of White and African-American women on the scales of the VPI and SDS are considerably more similar than different. The Enterprising and Conventional scales of the VPI show that African-American women, as compared to White women in the same occupation, obtain significantly higher mean raw scale scores. The results suggest that both the VPI and the SDS tend to be more accurate with African-American women than with White women. Researchers did point out, however, that caution should be used in evaluating the results of the study because of its small sample size.

Current Congruence Study on a Nonwestern Population

Khan, Alvi, Shaukat, Hussain, and Baig (1990) conducted a study of the congruence concept of Holland's (1985b) theory with a nonwestern culture. The researchers were examining whether the Holland theory would show congruence between personality type and academic program chosen among a group of 376 students from Pakistan (243 males and 133 females). The subjects were enrolled in six fields of study (i.e., majors) including engineering (60 males and 0 females), medicine (43 males and 24 females), fine arts (13 males and 50 females), social work (33 males and 25 females), administrative science (51 males and 14 females), and commerce (43 males and 20 females).

The SDS was used to assess Holland types (i.e., R, I, A, S, E, and C). Congruence was operationally defined by the researchers as the match between the college major and the appropriate first letter code (i.e., high point personality code) of the SDS. Data analysis included multivariate and univariate methods, the Sheffe multiple comparison statistic, and a hit rate analysis. Results suggest that the fine arts major (i.e., Holland code A) had the most congruence with 78% of the students having an "A" high point code. Sixty-nine percent of the social work students (i.e., Holland code S) had an "S" code. Sixty percent of the medicine and engineering students (i.e., Holland code I) had an "I" code. The researchers noted little congruence for the commerce and administrative majors. Hit rates for administrative majors, while not significant, grouped around Enterprising and Social Holland types, and commerce majors hit rates, while not significant, grouped around Social, Enterprising, and

Conventional types. Researchers noted that differences in mean scores for these different groups are in the expected direction. According to the researchers, this outcome supports the validity of the SDS and also points to the usefulness of the congruence concept in career counseling in a nonwestern culture. The researchers indicated that they were unable to use a more rigorous analysis such as the Iachan (1984) index because three-letter codes were not obtainable. The problem associated with obtaining three-letter codes was caused because some majors, such as engineering, had many components within the field (i.e., electrical, civil, and mechanical) which made absolute congruence estimates impossible. The researchers warn that in the absence of more rigorous tests of congruence caution is suggested in the interpretation of this study.

Support for the Approach to the Study and Support for the Measurement Technique

This study investigated the Holland theory, specifically the differences between African-American and White samples in specific advanced educational majors (i.e., specific engineering majors), holding major constant. African-American and White students attending classes in specific engineering majors are located in the state of Florida in various training institutions and were assessed using the Self-Directed Search (SDS). The principal researcher visited and administered the SDS at these sites. Collected data were analyzed. The SDS was utilized in this study because it is the primary expression and operationalization of Holland's (1973, 1985b) theory.

Summary

The problem of possible bias in the Holland theory (1973, 1985b) was examined in this study. Is Holland's theory, operationalized by the Self-Directed Search, measuring the same characteristics for African-Americans as for Whites?

A lack of consensus about the validity of Holland's theory as it applies to minorities, and a projection of larger numbers of minorities in the U.S. work force, suggested a need for further exploration. Results of prior studies, though encouraging, seem inconclusive. The research literature reviewed in this study is equivocal (i.e., there was too much uncertainty associated with the outcomes). Sample sizes were consistently small, the larger data sets being, in some instances, obtained for other reasons than studying African-Americans and Whites. This study analyzed a more specific group, that is, a group that was more clearly selected into a particular educational area, the assumption being that this group may reflect more consistently and accurately Holland's concepts. A larger new sample was utilized. In this study congruence (i.e., similarity between personality type and environment) was investigated by comparing African-American to White subjects.

CHAPTER III
METHODOLOGY

This descriptive research study examined the differences between African-American and White subjects relative to their scores on the Self-Directed Search (SDS) (Holland, 1985a). The results of this study examined whether bias in the theory is present. Results will also assist researchers, human resource professionals, and vocational psychologists in better understanding the differences between African-Americans and Whites and the Holland theory.

This chapter consists of the following: (a) the variables being studied, (b) the sample, (c) the assessment instrument, (d) the research procedures, (e) data analysis, and (f) the permissions. The chapter ends with a review of the methodological limitations.

Description of the Variables Being Studied

The variables that were examined included the dependent variable or scores obtained on the Self-Directed Search (i.e., R, I, A, S, E, and C), and the independent variable or race (i.e., African-Americans and Whites).

Description of the Sample Being Studied

The sample suitable for study included engineers from any of the following areas: computer applications, aeronautical, marine, nuclear, quality control, electrical, civil, and chemical. All of these engineering fields show a Holland three-letter code structure of Investigative, Realistic, and Enterprising (IRE). As a result, any students from these engineering fields were considered adequate subjects.

The sample was collected from four universities in the State of Florida. They included Florida Agricultural and Mechanical University (FAMU), Florida State University (FSU), the University of Florida (UF), and the University of North Florida (UNF).

Florida Agricultural and Mechanical University (FAMU) was founded in 1887. It was designated the State Normal College for Colored Students. Today Florida A & M is one of the nine institutions in Florida's University System. In 1953, under the direction of Dr. George W. Gore, Jr., Florida Agricultural and Mechanical College was changed and given university status by state legislative action. The new name became Florida Agricultural and Mechanical University (FAMU). As of 1993 the university served approximately 10,000 students. This university admits qualified students of any race, creed, or color without prejudice; however, Florida A & M was originally a minority school serving African-American students, and it still enrolls a much higher proportion of African-Americans than any other group. Because of this, and the fact that it contains an engineering school, it was one of the sites chosen for this study. The FAMU engineering program was established in 1982 by the Florida legislature as a joint program with Florida State University. Students receive a degree from the institution where the student is registered while completing upper division studies (i.e., junior and senior years). The joint program is still in existence today (May, 1995). The mission of the FAMU engineering program is to provide innovative academic excellence with a 50% graduate and undergraduate minority enrollment. Florida A & M offers the bachelor of science (BS) degree in chemical, electrical, industrial, and mechanical engineering. A master of science degree (MS) is offered in chemical, civil, electrical, and mechanical engineering. The doctor of philosophy (PhD) degree is offered in chemical and mechanical engineering. All of these engineering programs are accredited by the Board of Engineering and Technology (ABET) (Gibbons, 1995).

Data were also collected at Florida State University (FSU). This institution was established in 1823 when the Territorial Legislature began to plan a system of higher education. By 1897 FSU was the state's only liberal arts college and was called Florida State College. In 1905 the University of Florida, at Gainesville, was established and designated a men's school. Florida State College became a women's school, and the males were transferred to Gainesville. In 1947 after World War II returning veterans caused Florida State College to be returned to coeducational status and finally to become Florida State University. In the Fall of 1993 FSU had 28,669 students.

As was mentioned earlier, FAMU and FSU have a joint engineering program and offer identical degrees. Florida State University is also fully accredited by the Accreditation Board of Engineering and Technology (ABET) (Burgess, 1995).

The largest institution data were collected from was the University of Florida (UF). It is regarded as the "Flagship" of Florida universities. It was established in 1853 with the joining of East Florida Seminary and Kingsbury Academy in Ocala. It was officially designated the University of Florida in 1906 when it was consolidated with the land-grant Florida Agricultural College in Lake City. The University of Florida was for men only until 1947. In 1995 UF is the 20th largest university in the United States. The University of Florida enrolls over 35,000 students coming from over 100 countries. In 1991 UF ranked 4th in the nation in the number of national merit scholars in attendance.

The college of engineering at UF offers degrees in the following engineering fields: aerospace, agriculture, chemical, civil, computer, electrical, environmental, industrial, materials, mechanical, and nuclear engineer. The UF engineering programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for

Engineering and Technology. The University of Florida college of engineering offers graduate degrees in engineering including the Doctor of Philosophy.

The last institution data were collected from was the University of North Florida (UNF). The University of North Florida is one of the nine state institutions in Florida and is considered a comprehensive, urban university. Founded in 1972, it was originally an upper division institution offering only bachelor's and master's degrees. In 1984 lower division freshmen and sophomores were added. As of 1994, UNF enrolls approximately 10,000 students. The UNF engineering program offers only the bachelor of science degree in electrical engineering at this time (Hedges, 1995).

The samples studied were selected from African-American and White populations. Each sample consisted of students from a specific major (i.e., engineering). Each sample consisted of at least 79 African-American students from an approved area of engineering and at least 81 White students from the same majors. These sample sizes were chosen using the following rationale. The conventional rule-of-thumb for many multivariate techniques (one of which, MANOVA, will be used in this study) is to use "at least 10 subjects per variable." As the SDS has six scales, this would require 60 subjects altogether. However, as indicated under the Research Questions section in Chapter I, some null differences are expected. Because predicting the null hypothesis is risky (i.e., as one can always guarantee null results by simply keeping the sample size too small), the "10-subjects-per-variable" was almost tripled. Thus, 160 subjects (approximately 80 per group) were used in this study. These sample sizes well exceed most of those used in previous research (i.e., see Chapter II).

Description of the Assessment Instrument

The Self-Directed Search Form R (SDS) (Holland, 1985a) is a self-administered (including groups), self-scored, and self-interpreted instrument. The author of the SDS is John L. Holland, and the publisher is Psychological Assessment Resources, Inc. It is purported to be usable with high school, college, and adult populations. The SDS requires approximately 35 minutes to administer and is not timed. It requires no computer or stencil to score. The directions for using the SDS seem clearly stated. Test questions appear to be appropriate for its proposed use (i.e., face validity). The instrument can be purchased for $47 and includes a package of 25 instruments and occupation finders. An accompanying professional manual can be purchased for an additional $20. The occupation finder provides a list of Holland's codes along with coinciding occupations. The SDS consists of six scales measuring the following six personality types: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional.

The instrument is designed with five sections: (a) Occupational Daydreams, in which the subject lists occupations that are of interest; (b) Activities, in which a subject is required to answer with a like (L) or dislike (D) to a variety of stimulus questions (e.g., fix electrical things); (c) Competencies, in which a subject is required to answer yes (Y) or no (N) to a wide variety of questions regarding their competencies (e.g., I can change a car's oil or tire); (d) Occupations, in which a subject is instructed to respond either yes (Y) or no (N) to a large listing of occupations (e.g., surveyor, bus driver, journalist, etc.); and (e) Self-Estimates, in which a subject is directed to rate themselves among two groups of six indices. The first group of estimates (i.e., six) include Mechanical Ability (R), Scientific Ability (I), Artistic Ability (A), Teaching Ability (S), Sales Ability (E), and Clerical Ability (C). The second group of estimates (i.e., six) include Manual Skills (R), Math Ability (I), Musical Ability (A), Understanding of Others (S), Managerial Skills (E), and Office Skills (C). Upon completion of the five sections, the subject is ready to score the instrument. Scoring is completed by bringing all the accumulated scores forward to a scoring section and adding up the results. The results yield the three highest Holland codes (i.e., predominate codes) out of Holland's six possible codes. In referencing the occupational directories (i.e., occupation finder, Dictionary of Occupational Types), a person can find a listing of suitable occupations according to the three top Holland codes.

Crites (1981) has explained that the SDS instrument grew out of another of Holland's instruments, the Vocational Preference Inventory (Holland, 1970). Scores on the SDS are ipsative (i.e., the individual responds by expressing an interest in one item over another). Ipsative scores use individual raw scores and are not based upon norm groups.

The norm data collected in support of the SDS were generated in 1971, 1973, 1975, 1976, 1977, and 1985. Subjects consisted of high school students, college students, and adults. All high school samples were pooled together as were college samples. This resulted in groups composed of 4,675 high school students and 3,355 college students. According to the 1985 SDS manual, the high school sample consisted of students from 12 schools across four states. The majority of the students were 11th graders and came from public, parochial, college preparatory, technical, and vocational school systems. The college sample was drawn from 10 institutions in nine states. The adult sample for the SDS is considered an accidental sample drawn from diverse sources.

According to Kaiser and Sweetland (1985) the measures of internal consistency (i.e., Cronbach's alpha) range from .70 to .93. Test-retest reliability (1977 edition) from 1 to 4 weeks range from .56 to .95. The manual (Holland, 1985a) does not report test-retest information for the 1985 revision. Concurrent validaties of the 1977 version compared to the 1985 version, which matched a subject's summary codes to their stated vocational choice, presented agreement scores ranging from 44% to 70% for the 1977 edition and from 48% to 62% for the 1985 edition.

According to Kaiser and Sweetland (1985), predictive validity of the 1971 edition (comparing summary codes to expressed vocational choice 1 to 3 years after completing the SDS) produced kappa values ranging from .24 ($p<.001$) to .33 ($p<.001$). The percent correct prediction values ranged from 26.6% to 72.4% (Holland, 1985a).

Crites (1978b), in a review of the SDS, indicated that profile comparison using the SDS was difficult because a low score (e.g., 6) for one subject may carry the same weight as a high score (e.g., 50) for another subject. That is, if one subject has a high point code of Artistic with a score of 6 and another subject has a high point code of Artistic with a score of 50, each will have the same weight in career selection. Crites maintained that profile shape and scatter are lost because of this rank order scoring system. Crites argued that the self-directed (i.e., the client can score and interpret the instrument) assumption regarding the SDS may be dangerous. Crites noted that 55% of 489 freshmen subjects at the University of Maryland made errors scoring the SDS.

Dolliver (1978) in a review of the SDS also criticized the self-directed aspect of the instrument, indicating that clients often make scoring mistakes and that the user's knowledge of Holland's (1973) theory of personality and occupational functioning may be weak. Although critical of the SDS, Dolliver (1978) also suggested that Holland has contributed greatly to the field by introducing an instrument like the SDS because it does not require sophisticated and costly computer scoring. The SDS is the premier operationalization of Holland's (1973) theory of vocational choice and, for this reason, was utilized in this study to examine possible bias in the theory.

Description of the Research Procedures

Test results were collected from the samples studied through the assistance of professors and counseling professionals. All data were collected on site. Confidentiality was maintained throughout the entire study. Raw scores for all six scales of the Holland (1985b) SDS instrument were obtained from each subject in the African-American and White sample. The subjects were chosen because they elected to enter into a specific engineering field. Raw data were scored and rescored by three different examiners in order to ensure accuracy.

Description of the Data Analysis

After the SDS data were gathered according to the procedures described above and raw scores obtained for each of the six SDS scales for each subject, these data were entered into the SAS package running on the IBM 4381 mainframe computer at the University of North Florida. After the data had been verified for data entry errors, the following analyses were performed.

Research Question 1

A one-way multivariate analysis of variance (MANOVA) was performed using Race as the independent variable and the six raw SDS scales (i.e., R, I, A, S, E, and C) as the dependent measures. This MANOVA tested whether or not there was a significant overall difference between African-American and White students in this study across all six SDS scales taken simultaneously. It was not clear whether this MANOVA would yield a significant multivariate effect as no differences were expected on the "predominant" scales (i.e., I, R, and E). The Pillai-Bartlett trace was used as the multivariate test statistic as it has been shown to be more robust against assumption violations (e.g., multivariate normality) than the commonly used Wilk's lambda criterion (Olson, 1976).

Research Question 2

Six one-way univariate analyses of variance (ANOVAs) were performed using Race as the independent variable and the six raw SDS scales as the dependent measures, each analyzed separately. These ANOVAs tested which specific scales yielded significant differences between African-American and White students in this study. It was expected that the three "predominant" scales (i.e., I, R, and E) would show no differences between the two groups, while the three "subordinate" scales (i.e., A, S, and C) may reveal some differences.

Research Question 3

Matrices of the Pearson product-moment correlations were computed among the six raw SDS scales for African-Americans and Whites, analyzed separately, and then for both groups combined. After converting these correlations into Fisher's Z-scores so they could be properly averaged and compared, the mean correlation among the "predominant" traits (i.e., I, R, and E) were compared to the mean correlation among the "subordinate" traits (i.e., A, S, and C) using Fisher Z-score differences, both within and between racial groups. Within either group, the average correlation for the "predominant" traits should be higher than that for the "subordinate" traits. Between the groups, there should be no differences: the mean correlations among the "predominant" traits should be similar for African-Americans and Whites, as should those for the "subordinate" traits.

Research Question 4

Each student's SDS scores were converted to Holland's three-character code by calculating the first-, second-, and third-highest SDS scores for that student and converting them to the corresponding Holland code. Theoretically, the engineering students in this study should yield an "IRE" code, or at least some combination thereof. All students who produce any combination of the Holland I, R, and E codes as their top three codes will be treated as "I-R-E" students, for the purposes of analysis; all others will be treated as "Other" codes. These codes will then be subjected to a two-way chi-square "goodness of fit" analysis, using Race as one of the variables and "I-R-E" (in any combination) versus "Other" Holland codes as the other variable. If these Holland codes are distributed about the same way between the two groups, the resultant chi-square should not be significant.

Furthermore, both White and African-American engineering students should produce an "I-R-E" Holland code (in any combination) at a frequency that is greater than that expected by chance, as compared to all "Other" combinations. This result should be obtained if the Holland theory, via the SDS, has any applicability to these students. The question of whether an "I-R-E" code (in any combination) is obtained more frequently than that expected by chance, versus all "Other" combinations, will be tested for statistical significance using a Binomial Probability test.

Permissions

Approval for this research was obtained from the Committee for the Protection of Human Subjects at the University of North Florida (see Appendix).

Methodological Limitations

Even though every attempt was made to select a suitable population, cost factors, travel time, time factors, voluntary subject participation, and other factors had an effect on the generalizability of the results. Consequently, using these results to make a statement about a specific situation in another setting should be done with caution. The problems of subject availability or mistrust are ever-present problems in this type of research. The resultant group of subjects were not randomized; they were chosen because they represented a subpopulation of the target group. The Holland theory does not suggest any limitations regarding the audience with which the instrument should be effective. It is translated into many different languages and used in many different countries; therefore, as long as the group size is adequate for the statistic in use, the study is valid.

Errors of instrument scoring or errors on the part of the subjects taking the instrument can occur. Measures to reduce scoring error were implemented. Data entry can produce errors. This possibility was addressed by multiple verification of the data as entered.

CHAPTER IV
RESULTS

To examine the differences between African-Americans and Whites regarding the Holland theory (1973, 1985b) the Self-Directed Search (SDS)(Holland, 1985b) was administered to students enrolled in four different state universities in the Florida system. The institutions included The University of North Florida (UNF), Florida A&M University (FAMU), Florida State University (FSU), and the University of Florida (UF).

In this chapter results of the study are presented as follows: (a) description of the sample under study, (b) a presentation of the descriptive statistics, and (c) an analysis of the results from the four research questions.

Sample Studied

The SDS was administered to 79 African-American and 81 White subjects. Subjects included in the study consisted of students in electrical engineering, chemical engineering, civil engineering, and computer engineering because these engineering fields have the Investigative, Realistic, and Enterprising (IRE) Holland code structure. Any engineering field not having this exact structure was excluded. Subjects were drawn from classes and organizations when they were available, and all students available in the correct engineering fields (i.e., IRE code structure) were allowed to participate. The sample is not randomized. Males represented 100% of the subjects. Females were not included in this study because sex differences would have added a confounding variable. Ages for the African-American group ranged from a low of 18 to a high of 28 and for the White group from a low of 19 to a high of 29. Students from UNF represented 35.5% of the subjects; students from FAMU represented 19.4% of the subjects; students from FSU represented 26.3% of the subjects; and students from UF represented 18.8% of the subjects. The demographic data for the subjects are presented in Table 1.

Descriptive Statistics

Table 2 displays the means, standard deviations, and sample sizes, by Race, for each of the six raw SDS scales. As in most other tables presented in this chapter, the SDS scales have been reordered into the predominate (I, R, and E) and subordinate (A, S, and C) scales theoretically appropriate for these samples of engineering students. These reorderings were deemed useful in facilitating the interpretation of the results presented in this section.

The mean SDS scores displayed in Table 2 indicate that Investigative, Realistic, and Enterprising, in that order, were, in fact, the predominate scales for these students.

Table 1

Sample

Demographic Variable	Frequency (f)	Percentage (%)
Race		
White	81	50.6
African-American	79	49.4
Total	160	100.0
Site/University		
UNF	57	35.5
FAMU	31	19.4
FSU	42	26.3
UF	30	18.8
Total	160	100.0
Class in College		
Freshmen	9	5.6
Juniors	103	64.4
Seniors	48	30.0
Total	160	100.0

This pattern held true for Whites as well as African-Americans. The pattern of the subordinate scales, on the other hand, varied slightly between the two groups. For White students the subordinate scales were ordered Social, Conventional, and Artistic (descending order), while for African-Americans these scales were ordered Social, Artistic, and Conventional. Thus, while the Social scale yielded the highest subordinate mean for both groups, the Artistic and Conventional scales were less consistent.

Inspection of the mean SDS scores in Table 2 reveal a very consistent pattern. In all but one case, White students tended to score higher on the SDS than African-American students. The lone exception was the Artistic scale, on which African-Americans scored negligibly (1/100th of a point) higher than Whites.

Table 2

Basic Descriptive Statistics By Race (Scales Reordered)

	SDS Scales					
	I	R	E	A	S	C
	Whites (n = 81)					
Mean	36.37	33.19	25.84	17.72	23.62	22.21
SD	7.01	8.07	9.14	10.01	9.12	8.40
	African-Americans (n = 79)					
Mean	30.57	24.10	23.49	17.73	22.85	17.59
SD	9.93	11.05	10.33	11.66	10.95	10.26
	All (N = 160)					
Mean	33.51	28.70	24.68	17.73	23.24	19.93
SD	9.03	10.65	9.78	10.82	10.04	9.62

Data Analysis

Research Question 1

Do African-American and White students who have selected the same educational program (i.e., specific engineering) differ across the six scales (i.e., R, I, A, S, E, and C) of Holland's SDS instrument?

A one-way multivariate analysis of variance (MANOVA) performed on all six of the raw SDS scales simultaneously, using Race as the independent variable revealed a significant multivariate difference between Whites and African-Americans: Pillai-Bartlett trace (V) = .2854, F (6, 153) = 10.18, p < .0001. This result is displayed at the top of Table 3. Although not necessarily expected, this highly significant multivariate effect provides ample justification for inspecting the results of the individual univariate analyses.

Research Question 2

If any differences exist between these African-American and White students, are they restricted to the "subordinate" scales of the SDS, that is, the three scales not included in Holland's 3-character code for the educational program (i.e., specific engineering degrees) in question? For example, certain engineering specialties (e.g., electrical) are classified by Holland as "IRE." If Holland's theory is not biased, we would expect these African-American and White students to score similarly on the "predominate" I, R, and E scales. However, African-American and Whites may differ on the "subordinate" scales A, S, and C, as these scales may measure other incidental differences between races that are not related to these subjects' common occupational preferences.

Six one-way analyses of variance (ANOVAs) were then performed on each of the individual SDS raw scales, again using Race as the independent variable. Results of these univariate tests are summarized in Table 3, below the multivariate test results. Contrary to expectations, Whites and African-Americans differed significantly on two of the three predominate scales.

Table 3

Summary of Analyses of Variance By Race (Scales Reordered)

	F	*df*	*p*
Multivariate Test (MANOVA):	10.18	(6, 153)	.0001
Univariate Tests (ANOVAs):			
I (Investigative)	18.29	(1, 158)	.0001
R (Realistic)	35.38	(1, 158)	.0001
E (Enterprising)	2.32	(1, 158)	.1298
A (Artistic)	0.00	(1, 158)	.9916
S (Social)	0.23	(1, 158)	.6296
C (Conventional)	9.71	(1, 158)	.0022

The strongest difference was obtained on the Realistic scale, on which White students scored significantly higher than African-American students, F (1, 158) = 35.38, p < .0001. White students also scored higher than African-Americans on the Investigative scale, F (1, 158) = 18.29, p < .0001. These findings are surprising not only because Investigative and Realistic are predominate scales for these students but also because they are the two strongest scales of the three. No significant differences were found on the third predominate scale, the Enterprising scale.

Whites scored significantly higher than African-Americans on one subordinate scale, the Conventional scale, F (1, 158) = 9.71, p = .0022. Unlike the differences obtained on the predominate Realistic and Investigative scales, this difference was not unexpected. The other two subordinate scales, Artistic and Social, yielded no significant differences.

Research Question 3

Are the correlations among the three "predominate" scales comprising Holland's 3-character code for the educational program in question higher than the correlations among the three "subordinate" scales? If so, does this pattern of correlations hold equally true for African-American and White students who have chosen the same advanced educational programs? For example, for certain engineering fields, we might expect the correlations among the I, R, and

E scales to be significant and positive. On the other hand, correlations among the "subordinate" scales A, S, and C should be lower, as the latter scales measure individual differences that are not related to the subjects' common occupational preference. If Holland's theory is not biased, this pattern of correlations should be equally applicable to African-Americans and Whites in the same educational program.

Pearson product-moment correlations among the six raw SDS scales were computed for Whites and African-Americans, first separately and then for both groups combined. These correlation matrices are displayed in Table 4.

Inspection of these correlation matrices reveals some interesting differences between the two groups. Contrary to expectations, White students showed no significant correlations among the predominate scales (I, R, and E). This result seems rather surprising, given the fact that I, R, and E, in that order, was indeed the dominant Holland pattern for these students--at least when taken as a whole. When taken individually, however, the weak correlations among the I, R, and E scales suggest that any given White student who scored higher on one of these scales did not necessarily score proportionately higher on one or both of the other two scales. Apparently, the relationship among the predominate scales for White students is more complex than originally anticipated. As for the subordinate scales (A, S, and C), the interrelationships for White students were more

Table 4

Correlation Matrices (Scales Reordered)

	SDS Scales					
	I	R	E	A	S	C
Whites (n = 81)						
I						
R	.20					
E	.21	.12				
A	.42***	.25*	.25*			
S	.34**	.15	.62***	.44***		
C	.28*	.05	.55***	.25*	.44***	
African-Americans (n = 79)						
I						
R	.55***					
E	.49***	.44***				
A	.54***	.55***	.42***			
S	.61***	.51***	.58***	.54***		
C	.45***	.47***	.74***	.42***	.60***	
All (N = 160)						
I						
R	.51***					
E	.40***	.33***				
A	.47***	.39***	.34***			
S	.49***	.35***	.60***	.50***		
C	.43***	.37***	.67***	.34***	.53***	

*$p < .05$. ** $p < .01$. *** $p < .001$.

straightforward, although still contrary to expectations. Each of these scales intercorrelated significantly, at least beyond the .05 probability level.

The intercorrelations among the predominate I, R, and E scales for African-American students were more aligned with expectations. Each of these scales intercorrelated significantly beyond the .001 probability level. However, contrary to expectations, the correlations among the subordinate scales (A, S, and C) were also significant beyond the .001 level for these students.

To conduct formal tests of the differences in correlations between the predominate and subordinate scales, the correlations displayed in Table 4 were converted to Fisher's $\underline{z}$-scores, because in that form correlations can be averaged and compared properly. After conversion, the average correlation (i.e., Fisher's $\underline{z}$) among the predominate scales (I, R, and E) was computed for Whites and African-Americans; similar computations were performed for the subordinate scales (A, S, and C). Table 5 summarizes the results of these computations, after reconverting the average Fisher's $\underline{z}$-scores back into correlations, for purposes of presentation.

The average correlations displayed in Table 5 confirm that which is visually apparent from inspection of the individual correlations in Table 4. For White students, the average correlation among the predominate scales was ($\underline{M}$ = .18) and the average correlation among the subordinate scales was ($\underline{M}$ = .38). However, according to a Fisher's $\underline{z}$-score difference test, this disparity was not significant

Table 5

Comparison Among Predominate and Subordinate Scales Average Scale Intercorrelations

	Predominate Scales (I,R,E)	Subordinate Scales (A,S,C)
Whites (n = 81)	.18 (a)	.38
African-Americans (n = 79)	.50 (b)	.52 (b)

Note. For ease of interpretation, the average correlations displayed in Table 5 were converted into Fisher's z-scores, averaged in that form, and then reconverted into Pearson product-moment correlations. Average correlations with different subscript notations differ significantly beyond the .05 level, according to the Fisher z-score difference test.

(p = .1646). Similarly, for African-American students, the average correlation among the predominate scales was (M = .50) and the average correlation among the subordinate scales was (M = .52); again, this difference was not significant. Indeed, the only significant differences obtained were between the average predominate correlation for Whites, on the one hand, and either of the average correlations for African-Americans (p = .0219 for the predominate scales and p = .0126 for the subordinate scales) on the other.

Results consistently indicate that the correlation among predominate scales (I, R, and E) is lower than that for subordinate scales (A, S, and C). This pattern is, of course, contrary to expectations. These results also indicate that the correlations among the SDS scales are consistently lower for White students than for African-American students, especially for the predominate scales.

Research Question 4

Do African-American and White students who have selected the same advanced educational program (i.e., specific engineering) differ in distribution of their 3-character Holland codes (i.e., as determined by the 3 high point codes on the six Holland scales)? Electrical engineers, for example, should ideally be classified as "IRE"; any exception to this classification should at least be some combination of I, R, and E. If Holland's theory is not biased, the pattern of 3-character Holland codes should be similar for African-Americans and Whites in the same educational programs.

Each student was assigned a 3-character Holland code by using that student's first, second, and third highest (i.e., predominate codes) SDS scores. Then, for each student, the resultant Holland code combinations were classified into either an "I-R-E" code (i.e., for those students who produced the I, R, and E Holland codes in any combination as their top three SDS scores) or an "Other" Holland code classification (i.e., for those students that did not produce the I, R, and E codes, in any combination, as their top three SDS scores). A cross tabulation was performed on the resultant "I-R-E" versus "Other" Holland codes by Race. The results of this cross tabulation are summarized in Table 6. This contingency table yielded a negligible chi-square of 2.07, df = 1, p = .150. This result indicates that Whites and African-Americans did not differ significantly with regard to their relative distribution of "I-R-E" versus "Other" Holland codes.

Table 6

Holland Code Cross Tabulations By Race

Holland Code	Whites	African-Americans	Total
I-R-E	29	20	49
Other	52	59	111
Totals	81	79	160

Note. The observed "I-R-E" frequencies displayed in Table 6 represent the predominate Holland codes that included the I, R, and E scales in any combination. The top three combinations that yielded other than I, R, and E, in any combination, were collapsed into the "Other" category shown above.

The results displayed in Table 6, however, also indicate that only 49 students (31%) produced an "I-R-E" Holland code, in any combination. Is this "I-R-E" Holland code combination "significant" (i.e., greater than that expected by chance), for the engineering students studied, regardless of Race? Given six Holland codes, taken in combinations of three, there are a total of 120 combinations of three "top codes" or predominate codes possible (order included). Of these 120 predominate possibilities, only six (6/120 = 6 or 5%) can include any I, R, or E combination. If the Holland test results were totally random, it would be expected that only 5% (i.e., 5% of 160 students = 8 students) would yield an I-R-E code, in any combination. Instead, 49 students (31%) yielded the "I-R-E" combination. This result, according to a Binomial Probability test, was significant beyond the .0001 probability level.

CHAPTER V
DISCUSSION

In this chapter the following sections will be discussed: (a) generalizability limitations, (b) a summary of the results, (c) an interpretation of the findings, (d) conclusions, and (e) implications and recommendations. The chapter will end with a summary.

Generalizability Limitations

The sample in this study was not randomized. Subjects were chosen because access was granted. Subject availability in this type of study represents one of the difficult parts of this type of research. Cost factors and time factors made it impossible to collect a random sample. As a result, any generalization of these data to other populations should be done with caution.

Summary of Results

From the descriptive data the Investigative, Realistic, and Enterprising scales, in that order, yielded the highest mean SDS scores of all six scales, for both White and African-American students. This pattern of means conforms to the IRE pattern expected for the engineering students studied. With the exception of a negligible difference on the Artistic scale, White students tended to score higher than African-American students on the SDS scales.

Research question number one asked do African-American students who have selected the same educational program (i.e., specific engineering) differ across the six scales (i.e., R, I, A, S, E, and C) of Holland's SDS instrument? The outcome of the study suggested a significant multivariate difference (via a MANOVA) between the means of White and African-American students on all six SDS scales taken simultaneously.

Research question number two asked if any differences exist between these African-American and White students, are they restricted to the "subordinate" scales of the SDS, that is, the three scales not included in Holland's 3-character code for the educational program or occupational group (e.g., engineers) in question? For example, certain engineering specialties (e.g., electrical) are classified by Holland as "IRE." If Holland's theory is not biased, we would expect these African-American and White students to score similarly on the "predominate" I, R, and E scales. However, African-Americans and Whites may differ on the "subordinate" scales A, S, and C, as these scales may measure other incidental differences between races that are not related to these subjects' common occupational preferences. The outcome of the study suggested that significant univariate differences (via ANOVAs) were obtained between the means of White and

African-American students on the predominate Realistic and Investigative scales, with White students scoring higher than African-Americans on both scales. These differences were not expected. White students also scored significantly higher on the subordinate Conventional scale. No other significant univariate differences were obtained.

Research question number three investigated whether the correlations among the three "predominate" scales comprising Holland's 3-character code for the educational program in question were higher than the correlations among the three "subordinate" scales. If the "predominate" scales do have a higher correlation, does this pattern of correlations hold equally true for African-American and White students who have chosen the same advanced educational programs? If Holland's theory is not biased, this pattern of correlations should be equally applicable to African-Americans and Whites in the same educational program. The outcome of the study indicated that contrary to expectations, White students produced weak (insignificant) intercorrelations among all the predominate scales (I, R, and E) but significant intercorrelations among all the subordinate scales (A, S, and C). As expected, African-American students showed significant intercorrelations among all the predominate scales (I, R, and E). However, they unexpectedly produced even stronger intercorrelations among the subordinate scales (A, S, and C), although this difference was not significant. The average intercorrelations among the SDS scales were consistently higher for African-Americans than for Whites, whether the scales were predominate or subordinate. When the average intercorrelation among the predominate scales for Whites was compared to either the predominate or subordinate average intercorrelations for African-Americans, the differences were significant.

Research question number four investigated whether African-American and White students who have selected the same advanced educational program (i.e., specific engineering) differ in distribution of their 3-character Holland codes (i.e., as determined by the 3 high point codes on the six Holland scales)? Electrical engineers, for example, should ideally be classified as "IRE"; any exceptions to this classification should at least be some combination of I, R, and E. If Holland's theory is not biased, the pattern of 3-character Holland codes should be similar for African-Americans and Whites in the same educational program. The outcome of the study indicated that when the engineering students in the current White and African-American samples were classified according to their predominate Holland code combinations (i.e., I,R, and E, in any combination) versus any "Other" combinations, a chi-square analysis by Race revealed no significant difference. Thus, White and African-American engineering students studied were distributed about equally according to their "I-R-E" versus "other" Holland code classifications. A Binomial Probability test revealed that the number of engineering students in the current White and African-American samples produced "I-R-E" Holland codes, in any combination, significantly more often than that expected by chance. This result suggests that the Holland theory via the Holland instrument (i.e., SDS) is applicable to the engineering students of both races in the sample studied.

Interpretation of the Findings

Important questions are identified because of the findings of this study. The following questions will be reviewed and possible answers suggested:

1. Why did White subjects score higher than African-American subjects on all but one of the SDS scales?

2. Why did Whites score significantly higher than African-Americans on the R, I, and C scales?

3. Why were the intercorrelations among the predominate scales so weak for Whites and lower than that of African-Americans?

4. Why were the intercorrelations among the subordinate scales higher than those for the predominate scales for both Whites and African-Americans?

In an attempt to answer the above questions, one is drawn back to Cheatham's (1990) exposition regarding Africentricity and Eurocentricity. Cheatham has maintained that African-Americans are different from Whites because of their historically different cultural system that still exists today. According to Cheatham, the African-American cultural system deemphasizes the individual. The individual exists as a reflection of the overall group and is valued accordingly. White society, according to Cheatham, values Eurocentric concepts which place the individual at the center of the society. Individualism is viewed as being more important than the societal good. Cheatham has suggested that because of slavery and other unpleasant experiences that African-Americans encountered in this country, their original African culture was not assimilated into White society but instead is maintained as a separate and distinctive culture. Based on this, it is the researcher's belief that Whites may be more likely to have specific interests that develop into specialties because of their cultural encouragement to be different. Conversely, African-Americans, encouraged to work more within a group, may develop more level and uniform interests and, therefore, less specialization.

The low intercorrelations among White scores indicate more specialized interest in very narrow areas, whereas the higher intercorrelations among predominate codes for African-Americans suggest more diversity and interests in more varied areas and thus lower scores with higher uniformity among the scores. This would be one possible explanation for the tighter grouping of scores for African-Americans that this study revealed.

Another more ominous explanation for differences in White and African-American scores may be historical discrimination. If a class of people is historically barred from particular areas of societal expression (e.g., scientific areas which would show a Holland code of "I" or realistic areas which would show a Holland code of "R"), then it would require several generations, after the cessation of outright discrimination, for that group to recover from the loss of enrichment in the deprived areas. African-Americans have higher scores on Holland's "A" code (i.e., artistic) and "S" code (i.e., social). In other studies (Kimball et al., 1973; Swanson, 1992), these two codes have elicited higher scores for African-Americans. Therefore, it seems that African-American cultures have placed historical value on the social and artistic traits.

It is difficult to say why the intercorrelations for Whites were higher on the subordinate scales than for the predominate scales. This is an issue of "complexity" and may not be easily explainable without further research. An assumption would again relate to culture. The lower and less specific areas for Whites (i.e., subordinate scales S, A, C) simply generated about equal interest and, therefore, higher correlations, rather than very specific interests.

It is impossible to state with any degree of certainty why these findings actually occurred with this type of study (i.e., noncausal). Environmental press based on cultural form and historical discrimination may be operative reasons for the differences between African-American and White engineers in this study; however, additional research in this area is necessary.

Conclusions

This study was an investigation of the differences between White and African-American engineering students as measured by the Holland theory. Holland's instrument correctly identified both groups as scoring in the same direction. It appears from these findings that the Holland theory not biased and is suitable for both groups in that it correctly identifies the proper codes among both groups although not at the same level of intensity. Because of the nonrandomization of the resultant sample, generalizability of the results are limited to populations that are very similar to the sample studied. It is also clear that if some of the interpretations of this study are correct, racial discrimination has far-reaching effects on a society past that which is apparent. Because of historical discrimination, certain groups of people may be prevented from progressing and contributing to the good of society.

Implications and Recommendations

The findings in this study suggest that while differences exist, Holland's theory measures both groups about equally well. Further research may concentrate on why differences exist between the groups studied. This may include examinations of world view and minority identity development. Additional nationwide studies of this type, with engineers and other occupational groups, may help to increase the generalizability of the findings of this study. This study has implications for test users, researchers in test development, and industrial counselors and psychologists in that the Holland theory appears useful with African-Americans even though differences were observed.

It is the contention of the researcher that African-Americans are identifiable in 1995 but may be more difficult to identify in the future relative to their cultural differences. The extent to which a group of people are enculturated depends to a great extent upon the ease with which they are accepted by the dominant culture.

Has African-American culture in the United States blended, at this point, so well that a study of this type is meaningless? The researcher believes that the answer to this question is accurately stated by Nobles (1991):

> Expressive behavior and cultural modalities are determined by philosophical definition. One can observe "Africanism" throughout the New World because the orientation that allows a people to develop or continue to utilize particular cultural elements was not interfered with. Thus, the statement "We are an African people" is valid because, for the most part, New World conditions did not permit the enculturation of African orientation. (p. 28)

Summary

This study was conducted to advance knowledge in the area of career theory especially as it relates to working with African-Americans. The question was whether the Holland theory was biased toward African-Americans? The outcome suggested that while some differences were apparent the Holland concept worked for both groups and bias was not present. Results of this study will hopefully add to the existing knowledge base regarding this issue.

The mission of the helping professions should be to assist those seeking help in the best way possible to achieve their goals. To examine the theories and concepts associated with counseling rigorously is the only way to improve the outcomes in this profession and, ultimately, to make the field of counseling more effective.

APPENDIX
PERMISSIONS

MUST BE TYPED

REQUEST FOR REVIEW BY INSTITUTIONAL REVIEW BOARD FOR
THE PROTECTION OF HUMAN AND ANIMAL SUBJECTS

Principal Investigator Joseph J. Camp

Faculty Advisor (if student project) Dr. Parker (Gainesville) Dr. Drummond (UNF)

College/Dept. Counselor Education Campus Address & Phone X2838 (Dr. Drummond)

Project Title An Examination of Holland's Theory Regarding An African-American Sample Compared to A White Sample.

Project Type: Non-funded (or student research) ☒ Externally Funded Research ☐

Supporting Agency (if any) UNF Submission Deadline 1994

Dated Submitted to DSR for Review 5/94 Project Termination Date 1994

Type Review Requested: Exempt/Category # X Expedited/Category # ____ Full IRB ____

****

IRB USE:

Type of Review: Same as Requested ☐ Other than Requested ☐ (Type)____

Subjects at Risk: Yes ☐ No ☐ Minimal ☐

If yes, potential benefits justify proceedings Yes ☐ No ☐

Informed Consent Required: Yes ☐ No ☐ If yes, forms approved: Yes ☐ No ☐

Modifications Required____

Second Review Needed: Yes ☐ No ☐

1st Review By:____ (signature and date)

☐ Approved ☐ Conditionally Approved, Pending Modifications ☐ Referred to Full IRB

2nd Review By:____ (signature and date)

☐ Approved ☐ Conditionally Approved, Pending Modifications ☐ Referred to Full IRB

Right to Appeal: ☐ Make appointment with Vice President for Academic Affairs

****

DSR USE:

Notices Sent:____

Informed Consent Forms Received:____ File Close:____

continued

Request Form (continued)

VIII. Certification of Principal Investigator

I have read and understand the U. S. Department of Health and Human Services procedures concerning research involving human subjects as stated in the January, 1981, Federal Register announcement of policy, and I will abide by them. In addition, I accept the following responsibilities:

1. I will obtain approval from the IRB prior to instituting any change in project protocol.
2. I will bring to the attention of the IRB the development of any unexpected risks.
3. I will keep signed consent forms, if required, from each experimental subject for the duration of the project and submit them to the UNF Division of Sponsored Research upon termination of the project.
4. I will submit a status report at 12 month intervals or as indicated attesting to the current status of the project.

If applicable to my project, I have attached a copy of the informed consent form(s) and a copy of the test instrument(s) for my project.

Robert J. Drummond

Signed Joseph J. Camp 5-23-94 Dr. Robert Drummond 5-23-94

Principal Investigator Date Faculty Advisor (if student project) Date

Otis Holloway Owens

Assistant Vice President/for Student Affairs 5/23/94

Department Chairperson Date

REFERENCES

Anastasi, A. (1985). Psychological testing (5th ed.). New York: Macmillan.

Bingham, R. P., & Walsh, W. B. (1978). Concurrent validity of Holland's Theory for college-degreed Black women. Journal of Vocational Behavior, 13, 242-250.

Bordin, E.S. (1968). A theory of vocational interests and psychotherapy. Educational and Psychological Measurement, 3, 49-66.

Brown, D., & Brooks, L. (1990). Career choice and development. San Francisco: Jossey-Bass Publishers.

Burgess, D. K. (Eds.). (1995). Florida State University general bulletin. Tallahassee: Florida State University, Office of the Registrar.

Campbell, D. P. (1977). Manual for the Strong-Campbell Interest Inventory (Rev. ed.). Stanford, CA: Stanford University Press.

Carter, R. T., & Swanson, J. L. (1990). The validity of the Strong Interest Inventory with Black Americans: A review of the literature. Journal of Vocational Behavior, 36, 195-209.

Cheatham, H. E. (1990). Africentricity and career development of African Americans. The Career Development Quarterly, 38, 334-346.

Clyde, D. J. (1969). Multivariate analysis of variance on large computers. Miami, FL: Clyde Computing Services.

Crites, J. O. (1978a). Career Maturity Inventory. Monterey, CA: CTB/McGraw-Hill.

Crites, J. O. (1978b). Review of the Self-Directed Search. In O. K. Buros (Ed.), The eight mental measurement yearbook (p. 1022). Highland Park, NJ: The Gryphon Press.

Crites, J. O. (1981). Career counseling models, methods, and materials. New York: McGraw-Hill Book Company.

Dolliver, R. H. (1978). Review of the Self-Directed Search. In O. K. Buros (Ed.), The eight mental measurement yearbook (p. 1022). Highland Park, NJ: The Gryphon Press.

Fouad, N. A., & Dancer, S. (1992). Cross cultural structure of interest: Mexico and the United States. Journal of Vocational Behavior, 40, 129-143.

Gibbons, M. B. (Ed.). (1995). Florida A & M University general catalog. Tallahassee: Florida A & M University, Office of the Registrar.

Gibbs, J. T. (1986). Assessment of depression in urban adolescent females: Implications for early intervention strategies. American Journal of Social Psychiatry, 6, 50-56.

Ginzberg, E., Ginzburg, S. W., Axelrod, S., & Herma, J. L. (1951). Occupational choice. New York: Columbia University Press.

Guthrie, R. V. (1976). Even the rat was white: A historical view of psychology. New York: Harper and Row.

Hager, P. C., & Elton, C. F. (1971). The vocational interests of Black males. The Journal of Vocational Behavior, 1, 153-158.

Hansen, J. C. (1987). Cross-cultural research on vocational interests. Measurement and Evaluation in Counseling and Development, 19, 163-176.

Hansen, J. C. (1992). Does enough evidence exist to modify Holland's theory to accommodate the individual differences of diverse populations? Journal of Vocational Behavior, 40, 188-193.

Hansen, J. C., & Campbell, D. P. (1985). Manual for the SVIB-SCII (4th ed.). Palo Alto, CA: Stanford University Press.

Hansen, J. C., & Fouad, N. A. (1984). Translation and validation of the Spanish form of the Strong-Campbell Interest Inventory. Measurement and Evaluation in Guidance, 16, 192-197.

Hedges, J. (Ed.). (1995). University of North Florida undergraduate catalog. Jacksonville: University of North Florida, Office of the Registrar.

Holland, J. L. (1966). The psychology of vocational choice. Waltham, MA: Blaisdell.

Holland, J. L. (1970). Manual for the Vocational Preference Inventory. Palo Alto, CA: Consulting Psychologists Press.

Holland, J. L. (1973). Making vocational choices: A theory of careers. Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1982). The SDS helps both females and males: A comment. Vocational Guidance Quarterly, 30, 195-197.

Holland, J. L. (1985a). The Self-Directed Search professional manual (Rev. ed.). Palo Alto, CA: Consulting Psychologists Press.

Holland, J. L. (1985b). Making vocational choices: A theory of vocational personalities and work environments (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L., & Gottfredson, G. L. (1992). Studies of the hexagonal model: An evaluation (or, the perils of stalking the perfect Hexagon). Journal of Vocational Behavior, 40, 158-170.

Hudson Institute. (1988). Workforce 2000. Washington, DC: Johnston, W. B., project director.

Iachan, R. (1984). A family of differentiation indices. Psychometrika, 49, 217-222.

Isaac, S., & Michael, W. B. (1985). Handbook in research and evaluation (2nd ed.). San Diego, CA: EDITS Publishers.

Kaiser, D. J., & Sweetland, R. C. (Eds.). (1985). The Self-Directed Search. Test critiques (Vol. II). Kansas City, MO: Test Corporation of America.

Khan, S. B., Alvi, S. A., Shaukat, N., Hussain, M. A., & Baig, T. (1990). A study of the validity of Holland's theory in a non-western culture. Journal of Vocational Behavior, 36, 132-146.

Kimball, R. L., Sedlacek, W. E., & Brooks, G. C., Jr. (1973). Black and White vocational interests on Holland's Self-Directed Search. Journal of Negro Education, 42, 1-4.

Lamb, R. R., & Prediger, D. J. (1979). Criterion-related validity of sex-restrictive and unisex interest scales: A comparison. Journal of Vocational Behavior, 15, 231-246.

Lee, C. C. (1985). An ethnic group-gender comparison of occupational choice among rural adolescents. Journal of Non-White Concerns in Personnel and Guidance, 13, 28-37.

Merton, R. K. (1957). Social theory and social structure. Glenco, IL: Free Press.

Nobles, W. W. (1976). Extended self: Rethinking the Negro self-concept. Journal of Black Psychology, 2, 15-24.

Nobles, W. W. (1991). African philosophy: Foundations for Black psychology. In R. L. Jones (Ed.), Black psychology (pp. 18-32). New York: Harper & Row.

O'Brien, W. F., & Walsh, W. B. (1976). Concurrent validity of Holland's theory for non-college-degreed Black working men. Journal of Vocational Behavior, 8, 239-246.

Olson, C. L. (1976). On choosing a test statistic in multivariate analysis of variance. Psychological Bulletin, 83, 579-586.

Parsons, F. (1909). Choosing a vocation. Boston: Houghton Mifflin.

Popham, W. J. (1981). Modern educational measurement. Englewood Cliffs, NJ: Prentice-Hall.

Prediger, D. J. (1981). Getting ideas out of the DOT and into vocational guidance. Vocational Guidance Quarterly, 29, 293-305.

Prediger, D. J., & Cole, N. S. (1975). It is time to face some issues: A response to Holland, Gottfredson, and Gottfredson. Journal of Vocational Behavior, 7, 261-263.

Roe, A. (1956). The psychology of occupations. New York: Wiley.

Schwartz, R. H. (1992). Is Holland's theory worthy of so much attention, or should vocational psychology move on? Journal of Vocational Behavior, 40, 179-187.

Smith, E. J. (1983). Issues in racial minorities' career behavior. In W. B. Walsh & S. H. Osipow (Eds.), Handbook of vocational psychology (Vol. I, pp. 161-222). Hillsdale, NJ: Lawrence Erlbaum.

Super, D. E. (1969). Vocational development theory. The Counseling Psychologist, 1, 2-30.

Swanson, J. L. (1992). The structure of vocational interests for African-American college students. Journal of Vocational Behavior, 40, 144-157.

Thomas, V. G. (1986). Career aspirations, parental support, and work values among Black female adolescents. Journal of Multicultural Counseling and Development, 14, 177-185.

University of Florida. (1995). The University Record. Gainesville, Florida: University of Florida Office of the Registrar.

U.S. Department of Labor. (1993). Occupational outlook handbook, 1990-1991 edition. Washington, DC: U.S. Government Printing Office.

Walsh, W. B., Hildebrand, J. O., Ward, C. M., & Matthews, D. F. (1983). Holland's theory and non-college-degreed working Black and White women. Journal of Vocational Behavior, 22, 182-190.

Ward, C. M. (1980). The concurrent validity of Holland's theory for non-degreed Black working women. Doctoral dissertation, The Ohio State University, Columbus. (University Microfilms No.80-22360)

Ward, C. M., & Walsh, W. B. (1981). Concurrent validity of Holland's theory for non-college-degreed Black women. Journal of Vocational Behavior, 18, 356-361.

Warwick, D. P. (1980). The politics and ethics of cross-cultural research. In H. C. Triandis & W. W. Lambert (Eds.), Handbook of cross-cultural psychology: Perspectives (pp. 319-371). Boston: Allyn and Bacon.

Weinrach, S. G. (1980). Have hexagon will travel: An interview with John Holland. Personal and Guidance Journal, 6, 406-414.

Yom, B. C., Doughtie, E. B., & Chang, W. C. (1975). The factor structure of the Vocational Preference Inventory for Black and White college students. Journal of Vocational Behavior, 6, 15-18.

BIOGRAPHICAL SKETCH

Joseph James Camp was born in Fort Bragg, North Carolina, the son of a career military officer. Because of his father's occupation, he had traveled across most of the United States and other countries by age 18.

Mr. Camp is a Vietnam military veteran. He has an associate's degree from Florida Community College at Jacksonville, a bachelor's degree in psychology from the University of North Florida, and a master of arts in counseling from the University of North Florida.

Mr. Camp has been employed in many different types of positions including sales, protective services, military service, manufacturing, building construction, automotive service, business ownership, corporate management, professional licensed provider of mental health services, research services and testing services to business and industry, and university teaching and counseling.

Mr. Camp enjoys computers, automotive design and construction, and building and residential remodeling.

Mr. Camp's future goals are to become a full-time university professor, provide counseling services to private individuals, and be a consultant to business, industry, and government.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Woodrow M. Parker

Woodrow M. Parker, Chair
Professor of Counselor Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Robert J. Drummond

Robert J. Drummond
Professor of Counselor Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Cecil D. Mercer

Cecil D. Mercer
Professor of Special Education

This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

August, 1995

Roderick J. McDavis

Dean, College of Education

Dean, Graduate School